

Claims

- [c1] What is claimed is:
1. A microprocessor system for correcting a faulty program code segment in a program ROM of an embedded microprocessor system, the microprocessor system having a program counter, the program counter comprising binary bits for storing the address of the next program code segment to be executed, the program correcting apparatus comprising:
 - a program RAM for storing a program code segment that is executed in place of the faulty program code segment stored in the program ROM ;
 - an address RAM for storing a plurality of correction entries, one correction entry being accessed and output according to a least significant bits portion of a value in the program counter;
 - an address detection unit connected to the program counter and the output of the address RAM, the address detection unit being capable of determining if a program code segment at an address in the program RAM specified by the correction entry outputted from the address RAM is to be executed;
 - wherein when the address detection unit determines that a program code segment at an address in the program RAM is to be executed, the address in the program counter is changed to access the program code segment in the program RAM.
 - [c2] 2. The program correcting apparatus of claim 1 wherein each correction entry of the address RAM comprises a valid bit field for flagging the correction entry as comprising valid correction information, a page number field for determining whether the correction entry corresponds to a page number currently in the program counter, and a jump address for specifying a location in the program RAM of the program code segment to be executed in place of the faulty program code segment.
 - [c3] 3. The program correcting apparatus of claim 2 wherein the address detection unit comprises one comparator with one input of the comparator connected to the output of the address RAM and another input of the comparator connected to the program counter.

- [c4] 4. The program correcting apparatus of claim 3 wherein the address detection unit further comprises an AND operator with one input of the AND operator receiving an output of the comparator and another input of the AND operator receiving the valid bit field of the outputted correction entry of the address RAM.
- [c5] 5. The program correcting apparatus of claim 4 wherein the address detection unit determines that a program code segment at an address in the program RAM is to be executed by comparing the page number of the outputted correction entry with the page number in the program counter, if the page numbers are the same and the valid bit of the outputted correction entry indicates the program code segment at the address in the program ROM is to be replaced, the program code segment at the address in the program ROM is to be replaced, if the page numbers are not the same or the valid bit of the outputted correction entry does not indicate the program code segment at the address in the program ROM is to be replaced, the program code segment at the address in the program RAM is not to be executed.
- [c6] 6. The program correcting apparatus of claim 1 further comprising a multiplexer having a first input receiving the output of the program ROM and a second input receiving an output of the program RAM, the multiplexer being coupled to the program counter such that if the most significant bit of the program counter indicates a corrected code segment, the multiplexer outputs the output of the program RAM, and if the most significant bit of the program counter does not indicate a corrected code segment, the multiplexer outputs the output of the program ROM.
- [c7] 7. The program correcting apparatus of claim 1 wherein the address RAM is part of the program ROM address space.
- [c8] 8. The program correcting apparatus of claim 1 wherein the address detection unit uses the outputted correction entry and the program counter to determine if a program code segment at an address in the program RAM specified by the correction entry outputted from the address RAM is to be executed.

[c9] 9. A method for correcting a faulty program code segment in a program ROM of an embedded microprocessor system, the microprocessor system comprising a program counter for storing an address of the next program code segment to be executed, an address RAM for storing a plurality of correction entries, and a program RAM for storing corrected code segments, the method comprising: accessing the address RAM with a least significant bits portion of the program counter to select one correction entry from the address RAM; comparing a page number field in the selected correction entry with a page number in the program counter to determine whether the selected correction entry corresponds directly to the program counter; if the selected correction entry corresponds directly to the program counter and a valid bit of the selected correction entry indicates a corrected code segment, using the selected correction entry to redirect the program counter to execute a corrected code segment.